Replacement

Chapter 1 Replacing the Components of Hitachi Data Ingestor ····· REP 01-0000

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Chapter 1 Replacing the Components of Hitachi Data Ingestor

When replacing parts, there are two types of parts; replaceable only when the power to the node is turned off, and replaceable regardless of the power status (on/off).

When replacing parts while the system is not in operation, replacement for both nodes is possible simultaneously. However, when replacing parts while the system is in operation, execute the failover and replace parts for each node separately.

When you replace the component that is replaceable only when the power to the node is turned off in the single node configuration, you need to stop system before replacement.

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Table 1-1 shows the parts to be replaced that do not reply on the hardware and the status of the OS operation to the node in replacement.

Table 1-1 Parts to be replaced that do not rely on the hardware and the status of the OS operation to the node in replacement

No.	Part	Node configuration	Node OS operation status and right or wrong of part exchange		Replacement procedure	Approximate work time
			On (*1)	Off (*2)		
1	LAN Cable	Cluster configuration	Y	Y	Replacement “1.5.1 Replacing the LAN Cable (cluster configuration)” (REP 01-0200)	10 minutes
		Single node configuration	Y (*3)	—	Replacement “1.5.2 Replacing the LAN Cable (single node configuration)” (REP 01-0260)	
2	Fibre Channel Cable	Cluster configuration	Y	Y	Replacement “1.4 Replacing the Fibre Channel Cable” (REP 01-0160)	10 minutes
		Single node configuration				
3	Management LAN IP-SW	Cluster configuration	Y	Y	Replacement “1.6 Replacing the Management LAN IP-SW (IP Switch)” (REP 01-0280)	90 minutes
4	Power Supply unit/ AC cable	Cluster configuration	Y (*1)	Y	Replacement “1.1.1 Replacing the Power Supply Unit/ AC cable (cluster configuration)” (REP 01-0030)	60 minutes
		Single node configuration	Y (*1),(*5)	Y	Replacement “1.1.2 Replacing the Power Supply Unit/ AC cable (single node configuration)” (REP 01-0060)	
5	Internal hard disk drive Solid State Drive (SSD) (*6)	Cluster configuration	Y (*1)	Y	Replacement “1.3.1 Replacing the Internal Hard Disk Drive (cluster configuration)” (REP 01-0110)	180 minutes
		Single node configuration	Y (*4)	Y	Replacement “1.3.2 Replacing the Internal Hard Disk Drive (single node configuration)” (REP 01-0150)	

*1: The node is in operation.
*2: The failover is being performed for the other node, and the user service continues. (However, the replacement of the management LAN IP-SW is to be performed after stopping the user service by turning off the power sources of the both nodes.)
*3: The replacement is performed by the system administrator.
*4: Replacement while the power is on is possible only when it is a single node failure. However, in the case of RAID6 configuration, replacement while the power is on is possible even when failures occur on two HDDs(SSDs).
In the configurations other than RAID6, replacement while the power is on is possible when failures occur on two HDDs(SSDs) of different RAID groups.
*5: Replacement while the power is on is possible only in case of redundant configuration.
*6: Replace the SSD in the replacement procedure of the Internal hard disk drive. In addition, in the cluster configuration, it does not support the SSD.

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Table 1-2 shows the parts to be replaced that reply on the hardware and the status of the OS operation to the node in replacement. The table of hardware vendor is also included in the following table because it must see the relevant manual provided by each hardware vendor when the parts are to be replaced.

Table 1-2 Parts to be replaced that do not rely on the hardware and the status of the OS operation to the node in replacement

No.	Part	Node configuration	Node OS operation status and right or wrong of part exchange		Replacement procedure	Approximate work time
			On (*1)	Off (*2)		
6	Internal RAID Battery	Single node configuration	N	Y	Replacement “1.7 Replacing the Internal RAID Battery” (REP 01-0330)	30 minutes
7	Front bezel	Cluster configuration	Y	Y	Replacement “1.8 Replacing the Front Bezel” (REP 01-0340)	3 minutes
		Single node configuration				
8	Other parts Fan unit RAID Controller Memory Fibre Channel Card GbE-4Port Card GbE-2Port Card 10GbE-2Port Card Motherboard DVD Drive CPU HDD Backplane	Cluster configuration	N	Y	Replacement “1.2.1 Parts replacement only when the node is turned off (cluster configuration)” (REP 01-0070)	Depending on the part.
	Front Panel Board PS Backboard Lithium Battery PCI Riser Board CPU Heat sink CPU Air Duct Cable BMC Management Port Internal RAID USB board LAN mezzanine SFP module	Single node configuration			Replacement “1.2.2 Parts replacement only when the node is turned off (single node configuration)” (REP 01-0090)	

*1: Replacement while the power is on is possible only in case of failure in one node. (Replacement must be performed while the power is off in case of failure in both nodes).
*2: The node is in operation.
*3: The failover is being performed for the other node, and the user service continues.

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1.1 Replacing the Power Supply Unit/ AC cable

For the cluster configuration, refer to “1.1.1 Replacing the Power Supply Unit/ AC cable (cluster configuration)”. For the single node configuration, refer to Replacement “1.1.2 Replacing the Power Supply Unit/ AC cable (single node configuration)” (REP 01-0060).

1.1.1 Replacing the Power Supply Unit/ AC cable (cluster configuration)

Execute the procedure by selecting one of the following methods:

Table 1.1.1-1 Replacing a power supply unit

Method	Node status at replacement	Replacement procedure
1	The node is running.	Replacement (1) Replacement procedure while the node is in operation (REP 01-0040)
2	The node is turned off.	Replacement (2) Replacement procedure while the node is turned off (REP 01-0040)

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(1) Replacement procedure while the node is in operation

NOTE: When replacing AC Cable, read the power supply unit as AC Cable in the procedure.

(a) Collect the OS log information before the replacement.
(You do not need to collect the OS log if it is already collected.)
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

(b) Refer to "D.1.1.1 Replacing the Power Supply Unit/ AC Cable (1) Replacement procedure while the node is in operation" and replace the power supply unit.

(2) Replacement procedure while the node is turned off

NOTE: When replacing AC Cable, read the power supply unit as AC Cable in the procedure.

(a) When the OS is running on the node to be maintained, collect the OS log information. (You do not need to collect the OS log if it is already collected.)
Collect the OS log on the both nodes.
When the OS of the node to be maintained is terminated, collect the log of the OS of the other side node. And then execute the procedure (e) and later. After the replacement is complete, collect the OS log of the node to be maintained.
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

(b) About the node in which the power supply unit to be replaced is mounted, check that the Resource Group on the node is not activated and the service is stopped.
Refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)" and execute the clstatus command on the both nodes.
- If the Node Status of the both nodes is "UP", go to step (c).
- If the Node Status of the node to be maintained is "INACTIVE", go to step (d).
- If the Node Status of the node to be maintained is "DOWN", go to step (e).
- If the Node Status of the both nodes is "UNKNOWN", wait for five minutes and perform the step (b) again. When the Node Status does not change from "UNKNOWN" even performed again, contact the Technical Support Center.

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(c) Request the system administrator to perform failover the resource group of the node to be replaced to the normal node and to set the "Node Status" of the node to be replaced to "INACTIVE" because the OS is required to be stopped when replacing.
After completing the operation by the system administrator, verify that the status is shown as in 1.1.1-2.
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation.
For the procedure of executing the operation, refer to "Maintenance Tool '3.1 Failover and Node Termination to Execute the OS stop or the OS reboot' (MNTT 03-0000)".

Table 1.1.1-2 Confirmation of Failover and Node Termination

Type of operation	Operation by the system administrator	Confirming operation by the maintenance personnel (*1)
Resource group failover	Transfers the resource group that is operating in the node to be maintained to the normal node. For the details, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Changing the execution node of a resource group'' (GENE 00-0040)".	Confirm that the "Running node" of the both resource groups are normal node.
Stopping Node	Stops the service of the node to be maintained. For the details, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Stopping and starting a node'' (GENE 00-0040)".	Check if the "Node Status" of the target node to be maintained shows "INACTIVE".

*1: Refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)".

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(d) Stop the OS on the target node. For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(e) Refer to "D.1.1.1 Replacing the Power Supply Unit/ AC Cable (cluster configuration) (2) Replacement procedure while the node is turned off", replace the power supply unit, and then check if it works normally.

(f) When all the checks are completed, obtain the OS log on both nodes.
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

(g) Request the system administrator to set the "Node Status" of the node where the power supply unit is replaced to "UP" and to perform failback the resource group, which has been performed failover, to the node where the power supply unit is replaced.
For the reference place in User's Guide describing the details about starting a node, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Stopping and starting a node'' (GENE 00-0040)", and for the reference place in User's Guide describing the details about failover/failback of a resource group, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Changing the execution node of a resource group'' (GENE 00-0040)". For the details about starting up node, refer to "User's Guide 'Stopping and starting a node'", for the details about failover/failback of a resource group, refer to "User's Guide 'Changing the execution node of a resource group'".
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation. For the procedure of executing the operation, refer to "Maintenance Tool '3.2 Failback and Start of Node After Starting the OS' (MNTT 03-0030)".

(h) For checking the failback, check that the "Node Status" of the node where the power supply unit is replaced is "UP" and the "Resource Group Status" is "Online/No error" in the display by referring to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)". If they are not displayed, perform from step (g) again.

NOTE: If "No error" is not contained in the indication for "Resource Group Status", which is the result of clstatus command when the resource group is in operation, report the content of "Resource Group Status" to the system administrator and eliminate the cause of the failure.
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation. For the procedure of executing the operation, refer to "Maintenance Tool '3.3 The Operation Accompanying Forced Stop of the Resource group' (MNTT 03-0060)".

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1.1.2 Replacing the Power Supply Unit/ AC cable (single node configuration)

Execute the procedure by selecting one of the following methods:

NOTE: Replacement while the node is running is possible only when the subject part to be replaced is redundant configuration.

Table 1.1.2-1 Replacing a power supply unit

Method	Node status at replacement	Replacement procedure
1	The node is running.	Replacement (1) Replacement procedure while the node is in operation (REP 01-0060)
2	The node is turned off.	Replacement (2) Replacement procedure while the node is turned off (REP 01-0060)

(1) Replacement procedure while the node is in operation

NOTE: When replacing AC Cable, read the power supply unit as AC Cable in the procedure.

(a) Collect the OS log information before the replacement.
(You do not need to collect the OS log if it is already collected.)
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

(b) Refer to "D.1.1.2 Replacing the Power Supply Unit/ AC Cable (single node configuration) (1) Replacement procedure while the node is in operation" and replace the power supply unit.

(2) Replacement procedure while the node is turned off

NOTE: When replacing AC Cable, read the power supply unit as AC Cable in the procedure.

(a) When the OS is running on the node to be maintained, collect the OS log. (You do not need to collect the OS log if it is already collected.)
When the OS of the node to be maintained is terminated, execute the procedure (c) and later. After the replacement is complete, collect the OS log of the node to be maintained.
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

(b) Terminate the OS of the node. Inform the system administrator of the stop of the service and get allowance to stop the service before stopping OS of the node.
For terminating the OS of the node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(c) Refer to "D.1.1.2 Replacing the Power Supply Unit/ AC Cable (single node configuration) (2) Replacement procedure while the node is turned off", and replace the power supply unit, and then check that it works normally.

(d) When all the confirmation is complete, collect the OS log of the node.
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

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1.2 Parts Replacement only when the Node is Turned Off

For the cluster configuration, refer to “1.2.1 Parts replacement only when the node is turned off (cluster configuration)”.
For the single node configuration, refer to Replacement “1.2.2 Parts replacement only when the node is turned off (single node configuration)” (REP 01-0090).

1.2.1 Parts replacement only when the node is turned off (cluster configuration)

NOTE: In the case of performing the BIOS setting at the time of replacing the parts on D51B-2U, attention should be paid.
When Save Changes and Reset on the BIOS Setup Utility is run in the state that the FC card is installed, a reboot fails and the node is frozen. To avoid this situation, for RAID Controller, Motherboard and Lithium Battery that need the BIOS setting when replacing the parts, removing the FC card when setting BIOS in accordance with the procedure is required.

(1) Replacement procedure while the node is turned off

(a) When the OS is running on the node to be maintained, collect the OS log information. (You do not need to collect the OS log if it is already collected.)
Collect the OS log on the both nodes.
When the OS of the node to be maintained is terminated, collect the log of the OS of the other node. And then execute the procedure (e) and later. After the replacement is completed, collect the OS log of the node to be maintained.
For collecting the OS log, refer to “Maintenance Tool ‘2.19 Collecting Logs (oslogget)’ (MNTT 02-1300)”.

(b) About the node in which the parts to be replaced is mounted, check that the Resource Group on the node is not activated and the service is stopped.
Refer to “Maintenance Tool ‘2.2 Displaying the Cluster Status (clstatus)’ (MNTT 02-0040)” and execute the clstatus command on the both nodes.
- If the Node Status of the both nodes is “UP”, go to step (c).
- If the Node Status of the node to be maintained is “INACTIVE”, go to step (d).
- If the Node Status of the node to be maintained is “DOWN”, go to step (e).
- If the Node Status of the both nodes is “UNKNOWN”, wait for five minutes and perform the step (b) again. When the Node Status does not change from “UNKNOWN” even performed again, contact the Technical Support Center.

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(c) Request the system administrator to perform failover the resource group of the node to be replaced to the normal node and to set the "Node Status" of the node to be replaced to "INACTIVE" because the OS is required to be stopped when replacing.
After completing the operation by the system administrator, verify that the status is shown as in Table 1.2.1-1.
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation.
For the procedure of executing the operation, refer to "Maintenance Tool '3.1 Failover and Node Termination to Execute the OS stop or the OS reboot' (MNTT 03-0000)".

Table 1.2.1-1 Confirmation of Failover and Stopping Node

Type of operation	Operation by the system administrator	Confirming operation by the maintenance personnel (*1)
Resource group failover	Transfers the resource group that is operating in the node to be maintained to the normal node. For the details, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Changing the execution node of a resource group'' (GENE 00-0040)".	Confirm that the "Running node" of the both resource groups are normal node.
Stopping node	Stops the service of the node to be maintained. For the details, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Stopping and starting a node'' (GENE 00-0040)".	Check if the "Node Status" of the target node to be maintained shows "INACTIVE".

*1: Refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)".

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(d) Replace the part in each name of the replacement items, and then check that it works normally.
Refer to the Table 1.2.3-1 in "Replacement '1.2.3 Location of the parts replacement only when the node is turned off" (REP 01-0100)", and execute the parts replacement procedures in each name of the items from the replacement procedure.

(e) When all the checks are completed, obtain the OS log on both nodes.
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

(f) Request the system administrator to set the "Node Status" of the node where the parts are replaced to "UP" and to perform failback the resource group, which has been performed failover, to the node where the parts are replaced.
For the reference place in User's Guide describing the details about starting a node, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Stopping and starting a node'' (GENE 00-0040)", and for the reference place in User's Guide describing the details about failover/failback of a resource group, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Changing the execution node of a resource group'' (GENE 00-0040)".
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation.
For the procedure of executing the operation, refer to "Maintenance Tool '3.2 Failback and Start of Node After Starting the OS' (MNTT 03-0030)".

(g) For checking the failback, check that the "Node Status" of the node after replacement is "UP" and the "Resource Group Status" is "Online/No error" in the display referring to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)". If they are not displayed, perform from step (f) again.

NOTE: If "No error" is not contained in the indication for "Resource Group Status", which is the result of clstatus command when the resource group is in operation, report the content of "Resource Group Status" to the system administrator and eliminate the cause of the failure.
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation. For the procedure of executing the operation, refer to "Maintenance Tool '3.3 The Operation Accompanying Forced Stop of the Resource group' (MNTT 03-0060)".

After confirming failback running, go back to the reference source of the Trouble Shooting section. The Trouble Shooting section eventually confirms recovery of hardware.
When a maintenance part is replaced, it is mandatory to execute "Troubleshooting '9.1.2 Confirmation of Recovery from Hardware Failure' (TRBL 09-0010)" to confirm no failure occurs in nodes.

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1.2.2 Parts replacement only when the node is turned off (single node configuration)

(1) Replacement procedure while the node is turned off

(a) When the OS is running on the node to be maintained, collect the OS log. (You do not need to collect the OS log if it is already collected.)
When the OS of the node to be maintained is terminated, execute the procedure (b) and later. After the replacement is completed, collect the OS log of the node to be maintained.
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

(b) Replace the part in each name of the replacement items, and then check that it works normally.
Refer to "Replacement '1.2.3 Location of the parts replacement only when the node is turned off" (REP 01-0100)", and execute the procedure for the parts replacement in each name of the items from the replacement procedure.

(c) When all the confirmation is complete, collect the OS log of the node.
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

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1.2.3 Location of the parts replacement only when the node is turned off

Table 1.2.3-1 shows the parts that are replaceable only when the node is turned off.

The item of procedures to be referred to execute the replacement for each part is also shown.

Table 1.2.3-1 Location of the replacing parts

No.	Parts	Replacement procedure	Approximate work time
1	Fan unit	"D.1.2 Replacing the Fan Unit"	30 minutes
2	RAID Controller	"D.1.4 Replacing the RAID Controller"	30 minutes
3	Memory	"D.1.5 Replacing the Memory"	30 minutes
4	Fibre Channel Card	"D.1.6 Replacing the Fibre Channel Card"	60 minutes
5	GbE-4Port Card / 10GbE-2Port Card	"D.1.7 Replacing the GbE-4Port Card"	30 minutes
6	GbE-2Port Card	"D.1.8 Replacing the GbE-2Port Card"	30 minutes
7	Motherboard	"D.1.9 Replacing the Motherboard"	50 minutes
8	DVD Drive	"D.1.10 Replacing the DVD Drive"	30 minutes
9	CPU	"D.1.11 Replacing the CPU"	30 minutes
10	HDD Backplane board (*1)	"D.1.12 Replacing the HDD Backplane board"	60 minutes
11	Front Panel Board	"D.1.13 Replacing the Front Panel Board"	30 minutes
12	PS Backboard	"D.1.14 Replacing the PS Backboard"	60 minutes
13	Lithium Battery	"D.1.15 Replacing the Lithium Battery"	30 minutes
14	PCI Riser Board	"D.1.16 Replacing the PCI Riser Board"	30 minutes
15	CPU Heat sink	"D.1.17 Replacing the CPU Heat sink"	30 minutes
16	CPU Air Duct	"D.1.18 Replacing the CPU Air Duct"	30 minutes
17	Cable	"D.1.19 Replacing the Cable"	30 minutes
18	BMC	"D.1.20 Replacing the BMC"	90 minutes
19	Management Port	"D.1.21 Replacing the Management Port"	—
20	Internal RAID Battery	"D.1.22 Replacing the Internal RAID Battery"	30 minutes
21	USB Board	"D.1.23 Replacing the USB Board"	30 minutes
22	LAN mezzanine	"D.1.8 Replacing the GbE-2Port Card"	30 minutes
23	SFP module	"D.1.24 Replacing the SFP module"	10 minutes

*1: Replacement procedures for back side part are also described in the reference section.

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1.3 Replacing the Internal Hard Disk Drive

For the cluster configuration, refer to '1.3.1 Replacing the Internal Hard Disk Drive (cluster configuration)'.
For the single node configuration, refer to Replacement "1.3.2 Replacing the Internal Hard Disk Drive (single node configuration)" (REP 01-0150).

1.3.1 Replacing the Internal Hard Disk Drive (cluster configuration)

Execute the procedure by selecting one of the following methods:

NOTE: Replacement of one internal HDD is performed online only, but replacement of two internal HDDs is performed offline only.

Table 1.3.1-1 Replacing an internal hard disk drive

Method	Node status at replacement	Replacement procedure
1	The node is running.(Replacement of One Internal HDD)	Replacement (1) Replacement procedure while the node is in operation (replacement of one internal HDD) (REP 01-0120)
2	The node is turned off (for two internal HDDs).	Replacement (2) Replacement procedure while the node is turned off (replacement of two internal HDDs) (REP 01-0130)

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(1) Replacement procedure while the node is in operation (replacement of one internal HDD)

NOTE: Replacement of one internal HDD is performed when online only. It cannot be performed when offline.

(a) Obtain the OS log before the replacement.
(You do not need to obtain the OS log if it is already obtained.)
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

(b) Refer to "D.1.3.1 Replacing the Internal Hard Disk Drive (cluster configuration) (1) Replacement procedure while the node is in operation (replacement of one internal HDD)", and replace the internal hard disk drive.

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(2) Replacement procedure while the node is turned off (replacement of two internal HDDs)

If replacing two internal HDDs, the new installation and the restoration of the OS disk are necessary after the replacement.
The procedures of replacing two internal HDDs are explained below.

(a) When the OS of the node to be maintained is stopped, collect the log of the OS of the other side node, and then execute the procedure (e) and later. After the replacement is complete, collect the OS log of the node to be maintained.
When the OS is running on the node to be maintained, collect the OS log information. (You do not need to collect the OS log if it is already collected.)
Collect the OS log on the both nodes.
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

(b) About the node in which the internal HDDs to be replaced is mounted, check that the Resource Group on the node is not activated and the service is stopped.
Refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)" and execute the clstatus command on the both nodes.
- If the Node Status of the both nodes is "UP", go to step (c).
- If the Node Status of the node to be maintained is "INACTIVE", go to step (d).
- If the Node Status of the node to be maintained is "DOWN", go to step (e).
- If the Node Status of the both nodes is "UNKNOWN", wait for five minutes and perform the step (b) again. When the Node Status does not change from "UNKNOWN" even performed again, contact the Technical Support Center.

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(c) Request the system administrator to perform failover the resource group of the node to be replaced to the normal node and to set the “Node Status” of the node to be replaced to “INACTIVE” because the OS is required to be stopped when replacing.
After completing the operation by the system administrator, verify that the status is shown as in Table 1.3.1-2.
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation.
For the procedure of executing the operation, refer to “Maintenance Tool ‘3.1 Failover and Node Termination to Execute the OS stop or the OS reboot’ (MNTT 03-0000)”.

Table 1.3.1-2 Confirmation of Failover and Stopping Node

Type of operation	Operation by the system administrator	Confirming operation by the maintenance personnel (*1)
Resource group failover	Transfers the resource group that is operating in the node to be maintained to the normal node. For the details, refer to “General ‘Reference Place in User's Guide for Operating Procedures Table 4 ‘Changing the execution node of a resource group’’ (GENE 00-0040)”.	Confirm that the “Running node” of the both resource groups are normal node.
Stopping node	Stops the service of the node to be maintained. For the details, refer to “General ‘Reference Place in User's Guide for Operating Procedures Table 4 ‘Stopping and starting a node’’ (GENE 00-0040)”.	Check if the “Node Status” of the target node to be maintained shows “INACTIVE”.

*1: Refer to “Maintenance Tool ‘2.2 Displaying the Cluster Status (clstatus)’ (MNTT 02-0040)”.

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(d) Terminate the OS on the target node. For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(e) Refer to "D.1.3.1 Replacing the Internal Hard Disk Drive (cluster configuration) (2) Replacement procedures with the power to the node turned off (replacement of two internal HDDs)", and replace the internal hard disk drive, and then check that it works normally.

(f) When all the checks are complete, collect the OS log on both nodes.
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

(g) Request the system administrator to set the "Node Status" of the node where the internal HDDs are replaced to "UP" and to perform failback the resource group, which has been performed failover, to the node where the internal HDDs are replaced.
For the reference place in User's Guide describing the details about starting a node, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Stopping and starting a node'' (GENE 00-0040)", and for the reference place in User's Guide describing the details about failover/failback of a resource group, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Changing the execution node of a resource group'' (GENE 00-0040)".
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation.
For the procedure of executing the operation, refer to "Maintenance Tool '3.2 Failback and Start of Node After Starting the OS'(MNTT 03-0030)".

(h) For checking the failback, check that the "Node Status" of the node after replacement is "UP" and the "Resource Group Status" is "Online/No error" in the display referring to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)". If they are not displayed, perform from step (g) again.

NOTE: If "No error" is not contained in the indication for "Resource Group Status", which is the result of clstatus command when the resource group is in operation, report the content of "Resource Group Status" to the system administrator and eliminate the cause of the failure.
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation. For the procedure of executing the operation, refer to "Maintenance Tool '3.3 The Operation Accompanying Forced Stop of the Resource group' (MNTT 03-0060)".

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1.3.2 Replacing the Internal Hard Disk Drive (single node configuration)

Execute the procedure by selecting one of the following methods.

Table 1.3.2-1 Replacing an internal hard disk drive

Method	Node status at replacement	Replacement procedure
1	The OS is in operation	Refer to “(1) In case that OS on node is in operation”
2	The OS is turned off	Refer to “(2) In case that OS on node is turned off”

(1) In case that OS on node is in operation

(a) Obtain the OS log before the replacement.
(You do not need to collect the OS log if it is already collected.)
For collecting the OS log, refer to “Maintenance Tool ‘2.19 Collecting Logs (oslogget)’ (MNTT 02-1300)”.

(b) Refer to “D.1.3.2 Replacing the Internal Hard Disk Drive (single node configuration), and replace the internal hard disk drive.

(2) In case that OS on node is turned off

(a) Refer to “D.1.3.2 Replacing the Internal Hard Disk Drive (single node configuration), and replace the internal hard disk drive, and then check that it works normally.

(b) When all the confirmation is complete, collect the OS log of the node.
For collecting the OS log, refer to “Maintenance Tool ‘2.19 Collecting Logs (oslogget)’ (MNTT 02-1300)”.

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1.4 Replacing the Fibre Channel Cable

Execute the procedure by selecting one of the following methods:

Table 1.4-1 Replacing a Fibre Channel cable

Method	Node status at replacement	Replacement procedure
1	The node is running.	Replacement (1) Replacing a Fibre Channel cable while the node is in operation (REP 01-0170)
2	The node is turned off (cluster configuration).	Replacement (2) Replacing a Fibre Channel cable while the node is turned off (cluster configuration) (REP 01-0180)
3	The node is turned off (single node configuration).	Replacement (3) Replacing a Fibre Channel cable while the node is turned off (single node configuration) (REP 01-0191)

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(1) Replacing a Fibre Channel cable while the node is in operation

(a) Check the status of the Fibre Channel connection on the node with the Fibre Channel cable to be replaced.
Confirm the status of the port for the cable not to be replaced is “online”. For details about how to check the status of Fibre Channel connection, refer to “Maintenance Tool ‘2.5 Displaying the FC Status (fpstatus)’ (MNTT 02-0280)”.
When the status of the port is not “online”, execute fponline command and set the port “online”. For details about the command, refer to “Maintenance Tool ‘2.9 Switching the FC Path to Online (fponline)’ (MNTT 02-0590)”.
If the status of the port is not able to be changed to “online”, execute replacing a Fibre Channel cable referring to “(2) Replacing a Fibre Channel cable while the node is turned off (cluster configuration)”.

(b) Disconnect the target Fibre Channel cable from the Fibre Channel port.

(c) Connect a new Fibre Channel cable.

(d) Check the link-up by the LED status of the connected port.
Check that the green LED beside the port lights up and go back to the reference source of the Trouble shooting section after confirming the link up.
The Trouble Shooting section eventually confirms the hardware recovery that contains the status of the Fibre Channel port is “online”.
When a maintenance part is replaced, it is mandatory to execute “Troubleshooting ‘9.1.2 Confirmation of Recovery from Hardware Failure’ (TRBL 09-0010)” to confirm no failure occurs in nodes.
If the link-up failed, another failure can be assumed. Perform the failure determination by referring to “Troubleshooting ‘5.1 Determining FC Path Failures’ (TRBL 05-0000)”.

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(2) Replacing a Fibre Channel cable while the node is turned off (cluster configuration)

(a) About the node to which the Fibre Channel cable to be replaced is connected, check that the Resource Group on the node is not activated and the service is stopped.
Refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)" and execute the clstatus command on the both nodes.
- If the Node Status of the both nodes is "UP", go to step (b).
- If the Node Status of the node to be maintained is "INACTIVE", go to step (c).
- If the Node Status of the node to be maintained is "DOWN", go to step (d).
- If the Node Status of the both nodes is "UNKNOWN", wait for five minutes and perform the step (a) again. When the Node Status does not change from "UNKNOWN" even performed again, contact the Technical Support Center.

(b) Request the system administrator to perform failover the resource group of the node to be replaced to the normal node and to set the "Node Status" of the node to be replaced to "INACTIVE" because the OS is required to be stopped when replacing.
After completing the operation by the system administrator, verify that the status is shown as in Table 1.4-2.
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation.
For the procedure of executing the operation, refer to "Maintenance Tool '3.1 Failover and Node Termination to Execute the OS stop or the OS reboot' (MNTT 03-0000)".

Table 1.4-2 Confirmation of Failover and Stopping Node

Type of operation	Operation by the system administrator	Confirming operation by the maintenance personnel (*1)
Resource group failover	Transfers the resource group that is operating in the node to be maintained to the normal node. For the details, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Changing the execution node of a resource group'' (GENE 00-0040)".	Confirm that the "Running node" of the both resource groups are normal node.
Stopping node	Stops the service of the node to be maintained. For the details, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Stopping and starting a node'' (GENE 00-0040)".	Check if the "Node Status" of the target node to be maintained shows "INACTIVE".

*1: Refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)".

(c) Stop the OS on the target node. For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(d) Disconnect the target Fibre Channel cable from the Fibre Channel port.

(e) Connect a new Fibre Channel cable.

(f) After you replace the Fibre Channel cable, press the power button on the node.

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(g) Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.

If the login prompt window is not displayed and a boot failure window is displayed, the OS startup is not successful because another failure has occurred. Refer to "C.2.4 Diagnosis for OS Boot Failure" and execute the solution to the failure. After recovering from the failure, proceed to the step (h).
If the login prompt window is displayed, proceed to the step (h).

(h) Check whether the OS is completely started on the node. To check, execute the peerstatus command on the other (normal) node and check whether the status is [BOOT COMPLETE].
For details about how to check node status, refer to "Maintenance Tool '2.36 Displaying the Status of Other Side Node (peerstatus)' (MNTT 02-2130)".

NOTE: Wait approximately 10 minutes until the OS is completely started.

(i) Check the LED for the port with the new cable and make sure a link is established. Check that the green LED beside the port (the upper LED) lights up. If the link-up failed, another failure can be assumed. Perform the failure determination by referring to "Troubleshooting '5.1 Determining FC Path Failures' (TRBL 05-0000)".

(j) Request the system administrator to set the "Node Status" of the node where the Fibre Channel cable is replaced to "UP" and to perform failback the resource group, which has been performed failover, to the node where the Fibre Channel cable is replaced.
For the reference place in User's Guide describing the details about starting a node, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Stopping and starting a node'' (GENE 00-0040)", and for the reference place in User's Guide describing the details about failover/failback of a resource group, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Changing the execution node of a resource group'' (GENE 00-0040)".
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation.
For the procedure of executing the operation, refer to "Maintenance Tool '3.2 Failback and Start of Node After Starting the OS' (MNTT 03-0030)".

(k) For checking the failback, check that the "Node Status" of the node after replacement is "UP" and the "Resource Group Status" is "Online/No error" in the display referring to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)". If they are not displayed, perform from step (j) again.
After confirming failback running, go back to the reference source of the Trouble Shooting section.
The Trouble Shooting section eventually confirms recovery of hardware.
When a maintenance part is replaced, it is mandatory to execute "Troubleshooting '9.1.2 Confirmation of Recovery from Hardware Failure' (TRBL 09-0010)" to confirm no failure occurs in nodes.

NOTE: If "No error" is not contained in the indication for "Resource Group Status", which is the result of clstatus command when the resource group is in operation, report the content of "Resource Group Status" to the system administrator and eliminate the cause of the failure.
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation. For the procedure of executing the operation, refer to "Maintenance Tool '3.3 The Operation Accompanying Forced Stop of the Resource group' (MNTT 03-0060)".

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(3) Replacing a Fibre Channel cable while the node is turned off (single node configuration)

(a) When the OS is running on the node to be maintained, collect the OS log. (You do not need to collect the OS log if it is already collected.)
When the OS of the node to be maintained is terminated, execute the procedure (c) and later. After the replacement is complete, collect the OS log of the node to be maintained.
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

(b) Terminate the OS of the node. Inform the system administrator of the stop of the service and get allowance to stop the service before stopping OS of the node.
For terminating the OS of the node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(c) Disconnect the target Fibre Channel cable from the Fibre Channel port.

(d) Connect a new Fibre Channel cable.

(e) After you replace the Fibre Channel cable, press the power button on the node.

(f) Check whether the OS is completely started on the node.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup is not successful because another failure has occurred.
Refer to "C.2.4 Diagnosis for OS Boot Failure" and execute the solution to the failure.
After recovering from the failure, proceed to the step (g).
If the login prompt window is displayed, proceed to the step (g).

NOTE: Wait approximately 10 minutes until the OS is completely started.

(g) Confirm that the resource group is operated normally.
Log in to the OS, execute rgstatus command, and then confirm that the resource group is operated normally. Refer to "Maintenance Tool '2.63 Resource group Status Display (rgstatus)' (MNTT 02-3380)" for the method of the confirmation.

(h) When all the confirmation is complete, collect the OS log of the node.
For collecting the OS log, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

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1.5 Replacing the LAN Cable

For the cluster configuration, refer to '1.5.1 Replacing the LAN Cable (cluster configuration)'.
For the single node configuration, refer to Replacement "1.5.2 Replacing the LAN Cable (single node configuration)" (REP 01-0260).

1.5.1 Replacing the LAN cable (cluster configuration)

NOTE:
- For Data port cable, request the system administrator for replacement.
- In the case of the management LAN IP-SW prepared by the customer, request the system administrator to replace the management port cable and BMC port cable.
  However, even in that case, the heartbeat port cable and the maintenance port cable must be replaced by the maintenance personnel.

LAN cables include the management port cable, the heartbeat port cable, the private maintenance port cable, the BMC port cable, and the data port cable.
For details about the connection location of the LAN cables, refer to "Installation '1.1.8 Connecting the LAN cable' (INST 01-0130)".

Execute the procedure by selecting one of the following methods:

Table 1.5.1-1 Replacing a LAN cable

Method	Node status at replacement	Replacement procedure
1	The node is running. (You can select this method only when a single failure has occurred.)	Replacement (1) Replacing a LAN cable while the node is in operation (REP 01-0210)
2	The node is turned off.	Replacement (2) Replacing a LAN cable while the node is turned off (REP 01-0230)

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(1) Replacing a LAN cable while the node is in operation

(a) Check whether any of the SIM messages listed in Table 1.5.1-2 SIM messages for LAN cable failures is displayed. For details about how to check messages, refer to "Maintenance Tool '2.6 Displaying SIMs on This Side (syseventlist)' (MNTT 02-0360)".

Table 1.5.1-2 SIM messages for LAN cable failures

No.	LAN Cable	SIM Message
1	Management port cable	On the node with the LAN cable to be replaced: 'KAQG72013-W Communication via the sub heartbeat cable was interrupted'. 'KAQK36504-W NIC : Link down detected(mng0)' 'KAQK37508-W BMC network communication failure detected' 'KAQK39504-E Link down in Front-end LAN' 'KAQG70000-E Failover started, Node-<*node number*>' 'KAQK37510-W Management network communication failure detected' 'KAQG70001-E Failover ended, Node-<*node number*>' On the normal node: 'KAQG72013-W Communication via the sub heartbeat cable was interrupted'. 'KAQK37510-W Management network communication failure detected'.
2	Heartbeat port cable	On the node with the LAN cable to be replaced: 'KAQG72012-W Communication via the main heartbeat cable was interrupted'. 'KAQK36504-W NIC : Link down detected(hb0)' On the normal node: 'KAQG72012-W Communication via the main heartbeat cable was interrupted'. 'KAQK36504-I NIC : Link down detected(hb0)'
3	BMC port cable	On the normal node: 'KAQK37508-W BMC network communication failure detected'. 'KAQK36504-W NIC : Link down detected(pm1)' (only in the BMC direct connection configuration)
4	Data port cable	On the node with the LAN cable to be replaced: ● When aggregation is not performed: 'KAQK39504-E Link down in Data LAN'. 'KAQK36504-I NIC : Link down detected(<*interface name*>)' 'KAQG70000-E Failover started, Node-<*node number*>' 'KAQG70001-E Failover ended, Node-<*node number*>' ● Either of the following when aggregation is performed: 'KAQG81003-W Trunking driver: One or more subdevices are down. <*master-device-name*>: <*subdevice-name*>' 'KAQG81101-W Trunking driver: The master device <*master-device-name*> is down because all the sub-devices were down'. 'KAQK36504-I NIC : Link down detected(<*interface name*>)'
5	Private Maintenance port cable	'KAQK36504-W NIC : Link down detected(pm0)
6	Reset port cable	On the node with the LAN cable to be replaced: 'KAQK36504-W NIC : Link down detected(pm1)'.

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(b) Check the hardware status to confirm that the LAN port to which the cable to be replaced is connected is “down”. However, for the BMC port, check from the normal node side that the connection is “failed”. (For checking the hardware status, refer to “B.3.1 Displaying the Hardware Status (hwstatus)”.

(c) Disconnect the failed LAN cable.

NOTE: Do not pull out the cable with excessive force. In addition, do not forcibly bend the cable upward or downward because the cable might be damaged.

(d) Connect a new LAN cable.

(e) After you replace the LAN cable, check whether one of the messages listed in Table 1.5.1-3 SIM messages for LAN cables after recovery is displayed. For details about how to check messages, refer to “Maintenance Tool ‘2.6 Displaying SIMs on This Side (syseventlist)’ (MNTT 02-0360)”.

Table 1.5.1-3 SIM messages for LAN cables after recovery

#	LAN Cable	SIM Message
1	Management port cable	On the node with the new LAN cable: ‘KAQG72015-I Communication via the sub heartbeat cable was restored.’ ‘KAQK37509-I BMC network communication failure recovered’ ‘KAQK37511-I Management network communication failure recovered.’ On the normal node: ‘KAQG72015-I Communication via the sub heartbeat cable was restored.’ ‘KAQK37511-I Management network communication failure recovered.’
2	Heartbeat port cable	On the node with the new LAN cable: ‘KAQG72014-I Communication via the main heartbeat cable was restored.’ On the normal node: ‘KAQG72014-I Communication via the main heartbeat cable was restored.’
3	BMC port cable	On the normal node: ‘KAQK37509-I BMC network communication failure recovered.’
4	Data port cable	Replacement node side: If the aggregation has not been performed, “No” • One of the following if the aggregation has been performed ‘KAQG81004-I Trunking driver: The subdevices that were down have been recovered. <*master-device-name*>: <*subdevice-name*>.’ ‘KAQG81102-I Trunking driver: The sub-devices that were down have recovered, and the master device <*master-device-name*> has recovered.’
5	Private Maintenance port cable	None
6	Reset port cable	None

(f) Check the hardware status to confirm that the LAN port for which the cable has been replaced is “up”. However for the BMC port, check from the normal node side that the connection is “ok”. (For checking the hardware status, refer to “B.3.1 Displaying the Hardware Status (hwstatus)”.

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(2) Replacing a LAN cable while the node is turned off

(a) On the normal node, check for messages. Check whether any of the messages listed in Table 1.5.1-4 SIM messages for LAN cable failures is displayed. For details about how to check messages, refer to "Maintenance Tool '2.6 Displaying SIMs on This Side (syseventlist)' (MNTT 02-0360)".

Table 1.5.1-4 SIM messages for LAN cable failures

#	LAN Cable	SIM Message
1	Management port cable	'KAQG72013-W Communication via the sub heartbeat cable was interrupted.' 'KAQK37510-W Management network communication failure detected.'
2	Heartbeat port cable	'KAQG72012-W Communication via the main heartbeat cable was interrupted.'
3	BMC port cable	'KAQK37508-W BMC network communication failure detected.' 'KAQK36504-W NIC : Link down detected(pm1)' (only in the BMC direct connection configuration)
4	Data port cable	None
5	Private Maintenance port cable	None
6	Reset port cable	On the normal node: 'KAQK36504-W NIC : Link down detected(pm1)'.

(b) About the node to which the LAN cable to be replaced is connected, check that the Resource Group on the node is not activated and the service is stopped.
Refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)" and execute the clstatus command on the both nodes.

- If the Node Status of the both nodes is "UP", go to step (c).
- If the Node Status of the node to be maintained is "INACTIVE", go to step (d).
- If the Node Status of the node to be maintained is "DOWN", go to step (e).
- If the Node Status of the both nodes is "UNKNOWN", wait for five minutes and perform the step (b) again. When the Node Status does not change from "UNKNOWN" even performed again, contact the Technical Support Center.

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(c) Request the system administrator to perform failover the resource group of the node to be replaced to the normal node and to set the "Node Status" of the node to be replaced to "INACTIVE" because the OS is required to be stopped when replacing.
After completing the operation by the system administrator, verify that the status is shown as in Table 1.5.1-5.
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation.
For the procedure of executing the operation, refer to "Maintenance Tool '3.1 Failover and Node Termination to Execute the OS stop or the OS reboot' (MNTT 03-0000)".

Table 1.5.1-5 Confirmation of Failover and Stopping Node

Type of operation	Operation by the system administrator	Confirmation operation by the maintenance personnel. (*1)
Resource group failover	Transfers the resource group that is operating in the node to be maintained to the normal node. For the details, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Changing the execution node of a resource group'' (GENE 00-0040)".	Confirm that the "Running node" of the both resource groups are normal node.
Stopping node	Stops the service of the node to be maintained. For the details, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Stopping and starting a node'' (GENE 00-0040)".	Check if the "Node Status" of the target node to be maintained shows "INACTIVE".

*1: Refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)".

(d) Stop the OS on the target node. For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(e) Disconnect the failed LAN cable.

NOTE: Do not pull out the cable with excessive force. In addition, do not forcibly bend the cable upward or downward because the cable might be damaged.

(f) Connect a new LAN cable.

(g) After you replace the LAN cable, press the power button on the node.

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(h) Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.

If the login prompt window is not displayed and a boot failure window is displayed, the OS startup is not successful because another failure has occurred. Refer to "C.2.4 Diagnosis for OS Boot Failure" and execute the solution to the failure. After recovering from the failure, proceed to the step (i).
If the login prompt window is displayed, proceed to the step (i).

(i) Check whether the OS is completely started on the node. To check, execute the peerstatus command on the other (normal) node and check whether the status is [BOOT COMPLETE].
For details about how to check node status, refer to "Maintenance Tool '2.36 Displaying the Status of Other Side Node (peerstatus)' (MNTT 02-2130)".

NOTE: Wait approximately 10 minutes until the OS is completely started.

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(j) On the node that is not installed with a new LAN cable, check for messages. Check whether any of the messages listed in Table 1.5.1-6 SIM messages for LAN cables after recovery is displayed. For details about how to check messages, refer to "Maintenance Tool '2.6 Displaying SIMs on This Side (syseventlist)' (MNTT 02-0360)".

Table 1.5.1-6 SIM messages for LAN cables after recovery

No.	LAN Cable	SIM Message
1	Management port cable	'KAQG72015-I Communication via the sub heartbeat cable was restored'. 'KAQK37511-I Management network communication failure recovered'.
2	Heartbeat port cable	'KAQG72014-I Communication via the main heartbeat cable was restored'.
3	BMC port cable	'KAQK37509-I BMC network communication failure recovered'.
4	Data port cable	None
5	Private Maintenance port cable	None
6	Reset port cable	None

(k) Check the hardware status to confirm that the LAN port for which the cable has been replaced is "up". However, for the BMC port, check from the normal node side that the connection is "ok". (For checking the hardware status, refer to "B.3.1 Displaying the Hardware Status (hwstatus)".)

(*l*) Request the system administrator to set the "Node Status" of the node where the LAN cable is replaced to "UP" and to perform failback the resource group, which has been performed failover, to the node where the LAN cable is replaced.
For the reference place in User's Guide describing the details about starting a node, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Stopping and starting a node'' (GENE 00-0040)", and for the reference place in User's Guide describing the details about failover/failback of a resource group, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Changing the execution node of a resource group'' (GENE 00-0040)".
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation. For the procedure of executing the operation, refer to "Maintenance Tool '3.2 Failback and Start of Node After Starting the OS' (MNTT 03-0030)".

(m) For checking the failback, check that the "Node Status" of the node after replacement is "UP" and the "Resource Group Status" is "Online/No error" in the display by referring to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)". If they are not displayed, perform from step (*l*) again.

NOTE: If "No error" is not contained in the indication for "Resource Group Status", which is the result of clstatus command when the resource group is in operation, report the content of "Resource Group Status" to the system administrator and eliminate the cause of the failure.
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation. For the procedure of executing the operation, refer to "Maintenance Tool '3.3 The Operation Accompanying Forced Stop of the Resource group' (MNTT 03-0060)".

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1.5.2 Replacing the LAN cable (single node configuration)

Request the system administrator to replace the LAN cable that is connected with the node.

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1.6 Replacing the Management LAN IP-SW (IP Switch)

Execute the procedure by selecting one of the following methods:

Table 1.6-1 management LAN IP-SW replacement

Method	Power supply status during replacement	Replacement procedure
1	The node is running	Replacement (1) Replacement procedure while the node is in operation (REP 01-0290).
2	The power supply is turned off	Replacement (2) Replacement procedure while the power supply is turned off (REP 01-0310).

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(1) Replacement procedure while the node is in operation

NOTE:
- To replace when the node is operating, it is premised that the management ports on the both nodes are directly connected to the LAN cable like the heart beat port before performing this procedure. However, the direct connection to the management ports is not required for the replacement in the status that the management LAN does not have a failure (No problem with the communication of the management ports on the both nodes).
- SIM of “KAQK37508-W” (Communication failure between the local node management port and the other node BMC port) and “KAQK39524-E” (Failure of collecting the other node status) is output on the both nodes by directly connecting the management ports. However, it has no problem. Therefore, continue to replace the parts.

To replace the management LAN IP-SW, perform the following steps from (1-1) to (1-4).

(1-1) Failover of the resource group

(a) When the resource group is in operation, execute the clstatus command on the both nodes and check the resource group status. If the resource group is running on each node as shown in Fig. 1.6-1, proceed to the step (1-1) (b). In other cases than the above, proceed to the step (1-2).

```
$ sudo clstatus

<Partially omitted>

--Resource Group Status--
Resource group name          : node0
Resource group status        : Online/No error
Running node                 : node0

Resource group name          : node1
Resource group status        : Online/No error
Running node        : node1
```

P

Q

If the “Resource group name” matches the “Running node” in (P) and if the “Resource group name” matches the “Running node” in (Q), as it indicates that the resource group is running on each node, proceed to the step (1-1) (b). In other cases than the above, proceed to the step (1-2).

Figure 1.6-1 Execution example of the clstatus command

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(b) Ask the system administrator to failover the resource group.
For the reference place for the failover of the resource group in the user`s guide, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Changing the execution node of a resource group'' (GENE 00-0040)".
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation.
Ask the system administrator which node should be used to failover the resource group. If no instruction is given, failover the resource group on the node 1 to the node 0.
For the procedure of executing the operation, refer to "Maintenance Tool '3.1 Failover and Node Termination to Execute the OS stop or the OS reboot' (MNTT 03-0000)".

(1-2) Replacement of the management LAN IP-SW

(a) Turn off the power of the management LAN IP-SW.

(b) Remove all the cables connected to the management LAN IP-SW.

NOTE:
- As the setting must be returned to the pre-replacement status after the management LAN IP-SW replacement, therefore, record the cable position and the VLAN setting information in advance.
- If the VLAN setting information is unavailable due to the outage of the management LAN IP-SW, execute the recovery by the default IP-SW configuration described in this manual.
For the VLAN setting method of the management LAN IP-SW,
"Installation 'Chapter 4 Overview of VLAN Setting Procedure for the Management LAN IP-SW' (INST 04-0000)".

(c) Replace the management LAN IP-SW.

(1-3) Confirmation of the management LAN IP-SW

(a) Execute the VLAN setting of the management LAN IP-SW. Refer to "Installation 'Chapter 4 Overview of VLAN Setting Procedure for the Management LAN IP-SW' (INST 04-0000)".

NOTE:
- The VLAN setting must be set to be the same as before the replacement.
- As for the parameters added to by the client, ask the system administrator for the setting.

(b) Refer to "Installation '1.1.8 Connecting the LAN cable' (INST 01-0130)", and correctly connect the each port and the ports of the management LAN IP-SW.

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(c) Connect the maintenance PC to the management LAN IP-SW and confirm that the link is up. Then, confirm that communication with the Private Maintenance ports of the both nodes is possible. If the communication is not possible, review the cable connection and the setting.

(d) Check the hardware status of the both nodes. Check that the “status” and “connection” of the “BMC Information” on the screen are both “ok” and that the “mng0” and “pm0” of the “Network Interfaces” are both “up”. (For checking the hardware status, refer to “B.3.1 Displaying the Hardware Status (hwstatus)”)

(e) Check the SIM message. Check that “KAQK37509-I” and “KAQK39525-I” are displayed in both nodes (For checking SIM messages, refer to “Maintenance Tool ‘2.6 Displaying SIMs on This Side (syseventlist)’ (MNTT 02-0360)”)

(f) Request the system administrator to check that the communication by the ping command is possible with the management ports and the BMC ports of the both nodes. If the communication is not possible, review the cable connection.

(1-4) Failback of the resource group

(a) Ask the system administrator to failover the resource group.
For the reference place for the failover of the resource group in the user`s guide, refer to “General ‘Reference Place in User’s Guide for Operating Procedures Table 4 ‘Changing the execution node of a resource group’’ (GENE 00-0040)”.
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation. For the procedure of executing the operation, refer to “Maintenance Tool ‘3.2 Failback and Start of Node after Starting the OS’ (MNTT 03-0030)”.

(b) After the completion of (1-4) (a), refer to “Maintenance Tool ‘2.2 Displaying the Cluster Status (clstatus)’ (MNTT 02-0040)” and confirm that “ACTIVE” is displayed in “Cluster Status”, that “UP” is displayed in the “Node Status” of the both nodes, and that “Online/No error” is displayed in “Resource Group Status”. If these are not displayed, execute (1-4) (a) and later again.

NOTE: If “No error” is not contained in the indication for “Resource Group Status”, which is the result of clstatus command when the resource group is in operation, report the content of “Resource Group Status” to the system administrator and eliminate the cause of the failure.
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation. For the procedure of executing the operation, refer to “Maintenance Tool ‘3.3 The Operation Accompanying Forced Stop of the Resource group’ (MNTT 03-0060)”.

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(2) Replacement procedure while the power supply is turned off

NOTE: Replacement is performed in a condition where OSs of the both nodes are terminated. For this reason, obtain permission to stop the HDI Series service and terminate OS from the system administrator in advance.

For the replacement of the management LAN IP-SW, perform the steps from (2-1) to (2-3).

(2-1) Termination of the OS on the both nodes

(a) After confirming that a failure occurred in the management LAN IP-SW, terminate the OSs of the both nodes. To stop the OS, stop the both node OSs by operating the power button. For more details, refer to "Installation '2.1.2.2 Terminating the OS of the node by operating the power button' (INST 02-0080)".

(b) Make sure that the OS is stopped on both nodes.

(2-2) Replacement of the management LAN IP-SW

(a) Disconnect all the cables from the management LAN IP-SW.

NOTE: You need to set up and configure the new management LAN IP-SW the same as before. Record the positions of the cables and VLAN settings.

(b) Replace the management LAN IP-SW.

(2-3) Confirmation of the management LAN IP-SW

(a) Configure VLANs on the management LAN IP-SW. For details about how to configure VLANs, refer to "Installation 'Chapter 4 Overview of VLAN Setting Procedure for the Management LAN IP-SW' (INST 04-0000)".

NOTE: The configuring of VLAN must be exactly the same as the one before the replacing operation.

(b) Refer to "Installation '1.1.8 Connecting the LAN cable' (INST 01-0130)". And connect the ports on the management LAN IP-SW with the correct ports.

NOTE: Connect the cables to the same ports as before.

(c) After you configure VLANs, start the OS on both nodes.
For details about how to start the OS, refer to "Installation '2.1.1 Procedure for turning on the power' (INST 02-0000)".

(d) Connect a maintenance PC and make sure a link is established. Then check whether the IP-SW can communicate with the Private Maintenance ports on both nodes. If not, review the cable connection and settings.

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(e) Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.

If the login prompt window is not displayed and a boot failure window is displayed, the OS startup is not successful because another failure has occurred. Refer to "C.2.4 Diagnosis for OS Boot Failure" and execute the solution to the failure. After recovering from the failure, proceed to the step (2-3) (f). If the login prompt window is displayed, proceed to the step (2-3) (f).

(f) Check the hardware status on both nodes. Check whether "ok" is displayed for both "status" and "connection" for "BMC Information" on the screen. Also check whether "up" is displayed for both "mng0" and "pm0" for "Network Interfaces".
For details about how to check the hardware status, refer to "B.3.1 Displaying the Hardware Status (hwstatus)".

(g) Ask the system administrator to check whether the IP-SW can communicate with the HFSM. If not, review the HFSM settings, the management LAN IP-SW settings and the cable connections.

(h) Request the system administrator to confirm that the node statuses of both nodes are UP and the resource groups are started. If the statuses are not as the above, request the system administrator to set the statuses of both nodes to UP and to start the resource groups.
For the reference place in User's Guide describing the details about starting a node, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Stopping and starting a node'' (GENE 00-0040)", and for the reference place in User's Guide describing the details about failover/failback of a resource group, refer to "General 'Reference Place in User's Guide for Operating Procedures Table 4 'Changing the execution node of a resource group'' (GENE 00-0040)".
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation.
For starting a node, refer to "Maintenance Tool '2.50 Node Start Up (ndstart)' (MNTT 02-2760)" and, for starting a resource group, refer to "Maintenance Tool '2.52 Resource group Starts Up (rgstart)' (MNTT 02-2870)".

(i) After you complete step (h), refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)". Check whether "Cluster Status" is "ACTIVE", "Node Status" of both nodes is "UP", and "Resource Group Status" is "Online/No error". If not, repeat step (h) and later.

NOTE: If "No error" is not contained in the indication for "Resource Group Status", which is the result of clstatus command when the resource group is in operation, report the content of "Resource Group Status" to the system administrator and eliminate the cause of the failure.
However, if the system administrator is absent, after contacting the system administrator and acquiring the permission for the above-mentioned operation, the maintenance personnel executes the operation. For the procedure of executing the operation, refer to "Maintenance Tool '3.3 The Operation Accompanying Forced Stop of the Resource group' (MNTT 03-0060)".

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1.7 Replacing the Internal RAID Battery

Refer to “D.1.22 Replacing the Internal RAID Battery”, and replace the internal RAID battery.

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1.8 Replacing the Front Bezel

Refer to “A.2.1 Front side” for installation and removal of a front bezel.

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